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# THE PLANT DISEASE REPORTER

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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# DISEASES OF DRUG AND RELATED PLANTS AT THE PLANT INDUSTRY STATION BELTSVILLE, MARYLAND IN 1943

Elmer C. Stevenson

CASTOR OIL PLANT (Ricinus communis L.). Seedling disease. - A seedling disease of the castor oil plant occurred extensively in the spring. The cotyledons or growing point, or both, were involved and generally the stem was attacked just below the soil line. Cotyledonary injury alone rarely killed the seedlings but when the growing point was involved the seedling usually died. A species of Alternaria was isolated consistently from the diseased tissue. The extent of the disease is shown in the following table:

Germination and seedling disease of the castor oil plant at Beltsville, Maryland, in 1943*

| Variety | Planted 4-25-43 | | Planted 5-11-43 | | Planted 5-29-43 | |
|---|---|---|---|---|---|---|
| | Emergence | Emerged seedlings diseased | Emergence | Emerged seedlings diseased | Emergence | Emerged seedlings diseased |
| | % | % | % | % | % | % |
| Kentucky 38 | 82.4 | 29.1 | 80.2 | 42.5 | 87.5 | 19.2 |
| Doughty 11 | 88.1 | 11.3 | 88.0 | 24.4 | 92.4 | 6.9 |
| Conner | 50.4 | 21.6 | 47.1 | 40.9 | 52.0 | 23.3 |

* 3000 seeds planted per variety, per date.

Capsule infection. - As early as August 1, a disease of the capsules of the castor oil plant appeared at the Beltsville Station. In some cases the capsules wilted suddenly, turned purple or dark brown, the pedicels collapsed, and the seed failed to fill normally. In other instances a sunken area developed, usually on one side of each capsule, and this enlarged until the whole capsule was involved. Filling of the seed was reduced but not so seriously as in the case of the sudden wilting of capsules. Infection spread rapidly, especially following rainy periods. In advanced stages the causal organism could be seen fruiting on the surface of infected capsules.

A species of Alternaria was isolated repeatedly from diseased tissue and the pathogenicity of this organism was established by inoculation tests.

The number of plants having this capsule disease by September 15, was determined on an area of approximately 5/6 of an acre. Of a total of 3,603 plants, 70% were found to be affected to some degree.

Leaf spot. - A certain amount of defoliation, which at first was thought to be natural, was noted throughout the summer. As the season progressed this defoliation became severe in some sections of the field. Affected leaves dried and curled at the edges, and necrotic areas developed along

the veins. Some plants were completely defoliated long before frost. A species of Alternaria, with spores similar to those produced on diseased capsules, was found sporulating freely on the affected areas following wet weather. Pathogenicity of this organism on the leaves has not been tested.

Stem canker. - A few isolated castor oil plants developed stem cankers, which enlarged slowly, causing the tissue to dry out and the stem to crack and become weakened, breaking readily. Alternaria spores similar to those found on diseased capsules and leaves were also found on these cankers. Parasitism of this organism on the stems has not been demonstrated.

CORIANDER (Coriandrum sativum L). About June 20, 1943, a disease was observed in one selection of the coriander planting. Localized infections occurred at the soil line or at various places up the stem. A lesion near the apex of the stem caused the tissue to collapse at this point, producing a gooseneck effect, the tissue above the lesion often remaining green and active. The leaves of some affected plants wilted and turned brown as if they had been scorched. Several adjacent plots of coriander from different seed sources showed little or no infection.

A species of Fusarium was isolated consistently from tissue transplants. Fusarium spores developed on lesions when diseased plants were placed in a damp chamber. No tests of pathogenicity have been made with this organism.

BIENNIAL HENBANE (Hyoscyamus niger L.). Tobacco mosaic. - Tobacco mosaic killed nearly the entire first year planting of henbane at Beltsville in 1942, but the disease was not so devastating on similar material in 1943. However, the number of plants infected in 1943 was very large as shown by the following table:

| Section | Degree affected | | | | Apparently disease-free |
|---|---|---|---|---|---|
| | Dead | Heavily | Medium | Lightly | |
| | % | % | % | % | % |
| Arlington #7 | 14 | 12 | 24 | 47 | 3 |
| Glenn Dale #8 | 15 | 11 | 10 | 61 | 3 |

PAPRIKA (Capsicum annuum L). Blossom-end rot. - This rot was first noticed on July 1, in the paprika planting at Beltsville, Maryland. The percentage of peppers of unmarketable quality caused by blossom-end rot ranged from 0 in some selections to as much as 30 in one selection. The average for all selections was 7%.*

Sunburn or sun scald. - This occurred to a limited extent during the hottest part of the summer and was followed by secondary soft rots and a species of Phoma.

Wilt. - Beginning the latter part of May, plants here and there through-

* Data supplied by W. E. Domingo, BPISAE, Beltsville, Maryland.

out the planting began to wilt. The affected plants were stunted, became chlorotic, and the leaves wilted, but the plants remained in this wilted condition for a long period of time with death occurring very slowly. By September 18, 1943, all 15 selections of paprika were affected to some degree by this wilt, infection ranging from 2% to 22% with a mean of 9%. Eight of the 15 selections contained plants that had died, presumably from the wilt described. The dead plants ranged from 1% to 12%, the mean being 4%. Repeated attempts to isolate a causal organism failed.

PERILLA (Perilla frutescens (L.) Britton). A wilt was noticed in the perilla plot, starting about June 20, 1943. The first symptom was a cortical rot of the stem at and immediately above the soil line. A little later the plants wilted, the tops bent over characteristically, and the plants died. This disease either attacks small plants or stunts the attacked plants because sections of a row could be found where the plants of an infected strip from 1 to 2 feet long were from 1/3 to 1/2 as tall as the neighboring unaffected plants.

A species of Fusarium was isolated repeatedly but the pathogenicity of the organism has not been tested.

SAGE (Salvia officinalis L.). In the last part of June a wilt began appearing on sage plants scattered over the field. The outside branches of the affected plants wilted first. The cortex at and just above the soil line became dark and disintegrated. If the center of the plant wilted, death followed, but if only a portion of the plant was affected the plant seemed to recover during the rest of the summer. The extent of the infection is shown by the following table:

| Selection | Wilted Plants |
|---|---|
| | % |
| Holt's Mammoth | 4 |
| Dalmatian | 10 |
| Number 1 | 8 |
| Number 6 | 4 |

A species of Fusarium was isolated from the diseased tissue. Tests of the pathogenicity of this isolate are in progress.

SESAME (Sesamum indicum L.). Wilt. - About midsummer a plot of sesame grown in the drug garden on the North Farm at Beltsville developed a wilt. The stems of the affected plants became darkened, the leaves lost their color and the plants wilted and died. A planting of sesame on the East Farm was not affected, the apparent difference between the two locations being that the drug garden is on poorly-drained soil while the East Farm planting was on well-drained sand. The cause of the wilt is still undetermined.

Leaf-spot. - A typical leaf-spot followed by petiole collapse developed on a limited number of plants of sesame on the East Farm at Beltsville. A species of Alternaria was isolated repeatedly from the diseased tissue and Alternaria spores developed in abundance on leaves placed in moist chambers. No pathogenicity tests were made.

Seed mold. - From mid-September until harvest time extensive molding of seed in the capsules occurred on the East Farm planting of sesame. Considerable numbers of seed germinated in the capsules but this was not thought to be associated with the seed mold. Affected seed turned dark brown and when plated on potato agar a species of Alternaria was isolated, with the same spore type as that causing the leaf spot. No inoculation tests have been made.

DIVISION OF DRUG AND RELATED PLANTS

## DISEASES OF SMALL GRAINS IN NORTH CENTRAL AND WEST TEXAS IN 1943

I. M. Atkins

OATS. Except for moderate stem rust [Puccinia graminis] damage on late-maturing oats in northcentral Texas, diseases were a minor factor in oat production in the State in 1943. A very light infection of crown (leaf) rust [P. coronata] was observed in some fields in the fall of 1942 but infection was not general. Nearly all fall-sown oats were later killed by the severe freeze of January 19, 1943. Spring-sown oats were subjected to severe low temperatures on March 5 resulting in stand reductions ranging from moderate thinning to complete killing. Following this setback, oats were late in maturing. No crown rust was found until May 1 and no general infection occurred until late in the month. As the crop did not mature until mid-June infection became rather general but did little damage. Stem rust appeared in the Denton area about May 15, causing moderate damage in some fields. Oat smuts (Ustilago spp.) were present in only a few of the fields examined and then only a trace was found. This is surprising as it was necessary to use much seed from other areas on account of loss of the crops in 1942 by green bugs (Toxoptera graminum) and in 1943 by severe cold weather.

WHEAT. The situation with regard to leaf rust [Puccinia rubigo-vera var. tritici] of wheat in the fall of 1942 was unusual. Precipitation during the fall was above normal and favorable for establishment of fall-sown wheat over most of the State. Temperatures during October were moderate, followed by November temperatures of more than 5° above normal. These conditions favored the development of one of the most severe fall leaf rust epidemics ever observed in north Texas. Farmers over a wide area complained of the reduction in pasture. The situation was favorable to the small-grain breeding program in that valuable notes on resistance and susceptibility were obtained. Most of the rust was destroyed by the low temperature of 4° F on January 19. A small amount survived and was observed in Febraury but as all top growth was again killed back by the March 5 freeze, no rust could be found following this freeze and it did not reappear until about April 1. Leaf rust spread rapidly during April and May and varieties normally highly resistant, such as Kawvale, Mediterranean, and even some Hope hybrids showed rather high infection. Tenmarq,

which normally is moderately resistant, was damaged considerably. This spring epidemic was confined to northcentral Texas however, and wheat in the Rolling Plains and the Pandhandle showed very little infection and no damage.

Stem rust was found in the Denton area on May 10 and spread fairly rapidly in such susceptible varieties as Red May and Mediterranean strains. The hard winter wheats Kanred, Tenmarq, and their derivatives, were resistant again this season. As most of the wheat in this area was of the Tenmarq variety, the loss from stem rust was negligible. No loss was sustained in the western part of the State.

Septoria was again very much in evidence in the Denton area. This is the third consecutive season this disease has been important. Although the loss is difficult to estimate, considerable reduction in the leaf area was noted during March and April previous to heading.

Only traces of loose smut (Ustilago tritici) and bunt (Tilletia spp.) were observed in wheat this year.

BARLEY. The same conditions that favored the leaf rust epidemic in the fall and again in the spring, also provided favorable conditions for barley mildew (Erysiphe graminis). An extremely heavy epidemic occurred during October and November, giving opportunity to record resistance and susceptibility in the extensive plantings of varieties and hybrid lines growing at Denton. All above-ground leaf growth of barley was killed by each of the 2 severe freezes mentioned and many strains completely winter-killed. Mildew reappeared on surviving strains in April and again became epidemic. Marked reduction in yield of barley on farms was noted in the Denton area. Neither leaf rust [Puccinia anomala] nor stem rust were factors in yield and only traces of smut [Ustilago spp.] were noted in fields examined this season. Net blotch (Helminthosporium teres) was noted in many fields and caused some damage.

DIVISION OF CEREAL CROPS AND DISEASES

## SPERGON, ARASAN, AND MERC-O-DUST INEFFECTIVE FOR THE CONTROL OF OAT SMUT

R. W. Leukel

Inconclusive results obtained in 1942 from experiments with Spergon and Thiosan as seed treatments for small grains [1] made it seem desirable to test these materials [2] again in 1943.

Seed of Wisconsin Wonder and State Pride were obtained from fields of smut-infected oats in Wisconsin, and seed of Hajira from a similar field in New York, through the kindness of Doctors H. L. Shands and F. P. Bussell, respectively. Smutfree seed of Colorado No. 37, obtained from Aberdeen, Idaho, through the courtesy of Harland Stevens, was inoculated with covered

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1/ Leukel, R. W. Spergon and Thiosan as seed treatments for small grains. U.S. Dept. Agr., Bur. of Plant Indus., Soils, Agr. Engin. Pl. Dis. Reptr. 26: 376-378 September 15, 1942.

2/ Arasan is the same as Thiosan except that the former is nonwettable.

Covered smut on oats grown from naturally infected and artifically inoculated seed sown in triplicated rod-rows at four[a] stations 1943.

| Variety | Treatment[b] | Smutted heads at Pullman, Wash. % | Urbana, Ill. % | Bozeman, Mont. % | Aberdeen, Idaho % | All stations Number | All stations % |
|---|---|---|---|---|---|---|---|
| Wisconsin Wonder | Check | 3.4 | 0.7 | 0.7 | 2.0 | 65 | 1.7 |
| | N. I. Ceresan | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | D.B. 1452-C | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Spergon | 0.6 | 0.0 | 0.5 | 0.5 | 19 | 0.4 |
| | Arasan | 2.2 | 0.0 | 1.7 | 1.3 | 58 | 1.3 |
| | Merc-O-Dust | 5.8 | 0.0 | 1.3 | 3.5 | 101 | 2.7 |
| State Pride | Check | 3.0 | 0.2 | 0.7 | 0.9 | 57 | 1.2 |
| | N.I. Ceresan | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | D.B. 1452-C | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Spergon | 0.4 | 0.0 | 0.3 | 0.3 | 12 | 0.3 |
| | Arasan | 0.8 | 0.0 | 0.9 | 0.5 | 31 | 0.6 |
| | Merc-O-Dust | 2.7 | 0.0 | 1.3 | 2.0 | 80 | 1.5 |
| Hajira | Check | 2.9 | 0.0 | 2.2 | 1.8 | 95 | 1.7 |
| | N.I. Ceresan | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | D.B. 1452-C | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Spergon | 1.6 | 0.0 | 1.3 | 0.5 | 41 | 0.9 |
| | Arasan | 3.3 | 0.0 | 2.0 | 0.9 | 75 | 1.6 |
| | Merc-O-Dust | 7.0 | 0.0 | 2.2 | 1.1 | 111 | 2.6 |
| Colorado No. 37[c] | Check (inoculated) | 64.0 | 31.8 | 52.4 | 44.5 | 1945 | 48.2 |
| | N.I. Ceresan | 6.2 | 1.2 | 3.1 | 5.3 | 165 | 4.0 |
| | D.B. 1452-C | 6.5 | 2.6 | 5.5 | 7.4 | 201 | 5.5 |
| | Spergon | 52.5 | 23.9 | 38.4 | 43.1 | 1626 | 39.5 |
| | Arasan | 62.4 | 21.5 | 41.2 | 37.2 | 1592 | 40.6 |
| | Merc-O-Dust | 75.6 | 36.3 | 47.5 | 42.8 | 1870 | 50.6 |
| | Check (not inoculated) | 00.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |

[a] Sown also at Beltsville, Maryland, but plants did not head.

[b] Spergon and Arasan were applied at 1 ounce per bushel; the others at 1/2 ounce.

[c] Inoculated by a spore suspension in vacuum.

smut by immersion in a spore suspension in partial vacuum and dried. Separate portions of each of these seed lots were dusted with the following materials: New Improved Ceresan (5% ethyl mercury phosphate), DuBay 1452-C (6.5% ethyl mercury toluene sulfonanilide), Spergon (tetrachloro-para-benzoquinone), Arasan (50% tetramethyl thiuramdisulphide), and Merc-O-Dust (described as containing 1.5% mercury in the form of "mercurized hydro aromatic compounds" and 2% formaldehyde), Spergon and Arasan were applied at the rate of 1 ounce and the other 3 dusts at 1/2 ounce per bushel. The treated seed, along with untreated seed, was sown in the spring of 1943 in triplicated rod-rows at Beltsville, Maryland, and also at 4 other experiment stations through the help and cooperation of the following investigators, who also took the data on smut control at their respective stations: C. S. Holton at Pullman, Washington; R. H. Bamberg at Bozeman, Montana; Harland Stevens at Aberdeen, Idaho; and Wayne Bever at Urbana, Illinois. No data of value were obtained at Beltsville because the plants failed to head. The data from the other stations are presented in the accompanying table.

Relatively few smutted plants developed from the 3 lots of uninoculated seed, although they had been obtained from fields that showed fairly high percentages of smutted plants. New Improved Ceresan and DuBay 1452-C eliminated this small amount of smut; Spergon and Arasan with 3 exceptions, reduced it somewhat, while Merc-O-Dust had no apparent effect upon it.

In the artificially inoculated Colorado No. 37, from 31.8 to 64.0%, or an average of 48.2% of the heads grown from untreated seed were smutted. New Improved Ceresan was 92% and DuBay 1452-C was 89% effective in controlling this heavy infection; Spergon and Arasan were less than 19% effective; while Merc-O-Dust failed to affect the percentage of infection.

These results, it seems, eliminate Spergon and Arasan from further consideration as possible substitute treatments for oats. They also show Merc-O-Dust to be wholly without merit as a fungicide for treating oats. The writer has found it to be quite ineffective also as a seed disinfectant for the control for covered kernel smut of sorghum.

DIVISION OF CEREAL CROPS AND DISEASES

## NEMATODE SURVEY IN FLORIDA: EFFECT OF ROOTKNOT AND OTHER NEMATODES ON CELERY IN THE SANFORD AREA

A. L. Taylor

During the period December 4 to 11, inclusive, seedbeds and fields in the vicinity of Sanford, (Seminole County in eastern Florida), were examined.

At this time, the principal crop in both seedbed and field is celery. Celery can be found in all stages of growth from young plants in the seedbed to nearly mature plants in the field. In the latter case, the seed was planted during July and August and the plants set in the field in September or October.

Thirty acres of seedbeds in 10 locations were examined. The principal nematode parasite found was the rootknot nematode, Heterodera marioni. The amount of infection found in individual beds varied from a slight trace to 95% of the plants infected. Average for all seedbeds examined was 26% infected plants.

Infection was found to be heaviest on beds planted early in the season and least on beds planted late in the season. In some cases, the difference was very marked. For instance, on one farm, seedbeds planted in July were nearly 100% infected, while adjacent seedbeds planted in September had only a trace of infection. In the heavily infected beds, the rootknot had apparently killed over 75% of the plants.

Most of the farmers attempt to control rootknot by flooding their seedbeds for various periods of time in the summer. There was no general agreement among individuals as to the length of time it was necessary to flood for good control. Also, a few individuals, who appeared to be somewhat more observant than the average, stated that results of flooding were not uniform. This is illustrated by the seedbeds mentioned above. All of these beds were flooded for 3 weeks this summer. In another case, 25% rootknot infection was found on beds flooded 10 days, allowed to dry out and again flooded for 10 days.

In the fields examined, totaling 186 acres, rootknot infection ranged from a trace to 75% of the plants infected, with an average of about 10%.

Several fields were badly spotted with stunted plants, all of which were found to be heavily infected. In 2 cases (one field of celery and one of English peas) 75% of the plants were infected. All of these fields were planted early, i.e., in September and October. Fields planted late (November) were not found to be heavily infected.

Control measures practiced in the field generally included the use of cover crops of Crotalaria spectabilis and of beggarweed. In addition, fields are intensively cultivated, heavily fertilized, and subirrigated by the use of artesian water. The result is a rather surprising absence, not only of damage by rootknot, but of actual infection also. Apparently, celery is highly tolerant to rootknot if growing conditions are good and is damaged only when active growth is checked by unfavorable weather or lack of fertilizer or water. When growing conditions are good, roots are produced profusely and the plant is not greatly affected. But when growing conditions are poor, the nematodes often gain the upper hand.

Numerous soil and root samples from seedbeds and fields were examined. These contained large numbers of free living nematodes, the most common one being a species of Acrobeles. Also noted were numerous specimens of a genus closely related to Paratylenchus, and belonging to at least 2 species. These nematodes had long slender stylets. They were often associated with a disease of celery known locally as "red root". Roots of affected plants had numerous small brownish lesions, usually terminal, but not uncommonly girdling the root at other points. These lesions were somewhat reminiscent of those caused by the meadow nematodes, but this species was not found either in roots or in the soil around roots. The exact relation of the Paratylenchus spp. to "red root" could not be ascertained. No definite cause of the disease was known to the local experiment station workers. One celery field observed had 50% of the plants stunted by this disease. In this field, little rootknot was present.

Small areas of other crops than celery were examined. Lettuce was not found infected with rootknot in the seedbed, though an early planting in one field was lightly infected with no apparent damage. Cabbage was not found infected, either in the seedbed or in the field. Small cabbage plants next to a heavily infected lettuce seedbed were not infected. Escarole (one field) and eggplant (one field) had only a trace of rootknot. A school garden at Oviedo had a moderate infection of rootknot.

Generally speaking, rootknot can be found in nearly all of the celery seedbeds and fields near Sanford. It is more troublesome on early planted material than on late planted material, with negligible damage on the late crop in most years. No economic damage was found on lettuce, cabbage, or eggplant, though English peas were found to be somewhat damaged. All of the growers are familiar with rootknot and take it into account when making their plans, but very few seem to have any particular fear of the pest, although all can tell of numerous instances when they or their neighbors have had a crop ruined by the pest. On the other hand, considering the fact that highly susceptible crops have been raised on all the land year after year for more than 40 years in some cases, there is a surprising absence of infection and damage. Apparently, the growers have learned by trial and error to get along with it and have long since accepted the constant reduction in yield of their crops as part of the game.

Recommendations. - It is recommended that a thorough study of rootknot and other nematodes as related to the crops of this section be made. The following points might be considered:

1. The relation of local soil temperatures to infection and to damage to plants.
2. Possible host specialization of local strains of nematodes.
3. Interrelationships between nematodes, water supply and fertilization.
4. The effect of flooding under local conditions.
5. The relation of nematodes to red root.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

## DESTRUCTIVE DISEASES IN AN OKLAHOMA SPINACH-GROWING AREA

K. Starr Chester

At the urgent request of County Agent Ira Hollar an inspection was made November 30 of approximately 1000 acres of mature or submature spinach near Muskogee, in company with Extension Horticulturist Fred LeCrone, and Horticulturist F. B. Cross. Downy mildew ("blue mold") [Peronospora effusa] was found on nearly one-half the acreage, the damage in individual fields ranging from 1 to 50%. In an 80-acre tract 50% loss was estimated at $5000. The crop was rejected for shipping, but part of it was usable for canning.

The land had been in spinach in the springs of 1942 and 1943, but no serious losses were experienced in those years. No white rust was present.

In another tract white rust [Albugo tragopogonis] caused 40% loss, but no downy mildew was present, and this was the only tract showing white rust.

In numerous other tracts examined in the afternoon downy mildew was slight to lacking, and there was no white rust but spinach blight (cucumber mosaic) was present in all tracts, the damage varying from 10 to 75% (fields near negro-operated tract).

The total planting in the several counties in the Arkansas River bottoms is estimated at 15,000 acres. The loss in Muskogee County alone was estimated by the county agent and farmers as no less than $50,000. Most of the spinach was destined for war contracts, about one-half for canning, and

the remainder for fresh market, the latter being shipped, in many cases, to distant points (Canada).

The fact that each field possesses pathological characteristics strikingly different from those of other nearby fields is strongly indicative that the disease problem is largely localized on each farm, and that its solution can be worked out individually with each farmer.

The shipper reported that both white rust (which he had heretofore called weather injury) and downy mildew have been associated with heavy losses in transit. This has been reported for rust previously. He cited an example in which a car was loaded one-half with healthy spinach, the other half with somewhat mildewed spinach. The normal half arrived safely, while the affected one-half load was a total loss on receipt. Although this is our first record of white rust for Oklahoma, this shipper reports its having been present in previous years. In the case of downy mildew, it is easy to see the reason for transit loss. Optimum temperatures for infection are 40-50° F. Standing water is required, and the infection requires 3 hours. On receipt from the fields the spinach, with very little picking over, is dumped into vats of cold water where it receives some washing. Judging by the color of the water, there is opportunity for conidia of the fungus to become thoroughly distributed among the leaves in this process. The wet spinach is then basketed with a shovelful of powdered ice. Powdered ice is blown into the car, and it is left thus for 3 or 4 days without re-icing, which occurs only in long trips, e.g. to Canada. Such cars act as great moist chambers and, assuming that the ice will be melted within a day or two, the temperatures in all probability are within the range 40-50° F., ideal for infection. Similar conditions apply to white rust. In spinach canning the loss involves first an excessive screening out of the smaller infected leaves, extra cost in picking over infected spinach, and disinclination of the canner to accept the spinach since a leaf yellowed by disease becomes brown and unattractive in the pack.

The Muskogee outbreaks were associated with a past month in which there was practically no rainfall. Throughout this period, however, the temperatures were in the range of 40-50°, and there were numerous heavy dews. Dry weather somewhat retarded growth of the crop. Most fields had histories of repeated spinach culture at least once, sometimes twice a year. Farmers and county agents declare that there is no spinach in the vegetative state during the summer. The crop overwinters regularly in all fields. Oöspores were plentiful in old infected leaves with white rust. Thus far, oöspores have not been found in the case of downy mildew. With white rust the oöspores, indicative of soil infestation, readily explain the heavy infections in one tract and its absence in others. Absence of oöspores in the case of downy mildew raises the problem of its persistence through the summer, unless oöspores are produced only in the spring. No weed hosts are known.

Control: In spite of the disastrous losses in this fall's crop, associated with constant and indiscriminate spinach planting in past years, there is reason to believe that the problem may be solved to a large extent even as soon as the coming spring, the season in which greatest downy mildew losses are reported. Control must be worked out individually on each farm according to the pathological characteristics of that farm and to the following principles:

(1) Where downy mildew is the principal factor, with no known resistant

varieties and doubt as to the means of oversummering, it is advised that land bearing mildewed crops be taken out of spinach entirely for at least one year.

(2) Where blight or mosaic is the principal factor use of blight-resistant spinach varieties, e.g. Virginia Savoy or Old Dominion is advised.

(3) Where white rust is the principal problem change to the rust-resistant, flat-leafed canning varieties (Viroflay, Broad Flanders, King of Denmark, Victory, Zwann's Dark Green Bloomsdale, Zwann's Darkie, Prickly Winter, Harlem Market, Dark Green Giant Prickly) if spinach is to be grown within a year after an infected crop.

(4) While the evidence on the value of seed treatment in controlling mildew and white rust is inadequate, in view of the fact that there are some reports of transmission of downy mildew in or on seed, and that spinach seed treatment tests have proven the value of this practice in improving stands, it is recommended that all spinach seed in the Muskogee area be treated as a regular practice.

OKLAHOMA AGRICULTURAL EXPERIMENT STATION

## POTATO STORAGE DISEASES IN CENTRAL MAINE

R. C. Cassell

Potato storages in central Maine were visited November 28 to December 4. Potato acreage in the Corinna-Dover and surrounding areas is second in importance in Maine only to that of Aroostook County.

Sunburn was much less of a serious loss factor in central Maine than in Aroostook County. In central Maine the Katahdins and Sebagos in storage had from a trace of sunburn tubers to about 5 per cent, whereas in Aroostook County sunburn had affected 30-35 per cent of the tubers of these two varieties.

Frost injury is also much less of a storage factor in central Maine than in Aroostook County. Only 2 lots of stored potatoes in central Maine were found affected by frost. Both were in Corinna and only a trace of rot was found in each case.

Hollow heart (physiogenic) was found in all bins of Katahdins but not in serious proportions. Usually only a trace was present but 2 bins had about 1% as nearly as could be determined.

Late blight (Phytophthora infestans) was found in 75% of the storages inspected. Most bins had from a trace to 2 or 3%. However, one case of very serious late blight loss was encountered at Dover-Foxcroft. A large dealer there was grading out his bins and said that his loss promised to be 35 to 40% of his total storage including both certified seed and table stock. The loss will represent between 15,000 and 25,000 bushels, mostly Green Mountain. Most of the tuber rot was caused by late blight followed by bacterial soft rot.

Net necrosis (leaf roll virus) is now showing to some extent in practically all bins of Green Mountains. This was evidently a bad year for the farmers with respect to the spread of leaf roll in central Maine. Most bins with net necrosis had from a trace to 10% although one bin was found with 50%.

Stem-end browning (cause unknown) was found as a trace only in about 50% of the Green Mountain bins inspected. None was found in other varieties.

Scab (Actinomyces scabies) was found as traces only in about 50% of both Green Mountain and Katahdin bins.

No ring rot (Corynebacterium sepedonicum) was found in the central Maine area at this time in spite of the fact that it was rather bad in the area at digging time. Reports from growers and dealers are to the effect that ring rot apparently caused its tuber rot for this year in the field and immediately after digging. There has been no tuber rot developing from ring rot in storage.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

## POOR STORAGE ACCENTUATING POTATO ROT IN OREGON

L. W. Boyle

Because of increased production, many potatoes in one locality were stored in warehouses not designed primarily for this purpose. As a result, rots are rapidly decomposing the tubers. The loss of one large grower has been tentatively estimated to be about 20,000 sacks. Efforts are being made to check the loss by washing and sorting the tubers. Much of the excess crop may be saved if it can be disposed of quickly in nearby markets for processing purposes. In addition to the loss of the crop itself, the cost of sorting in such a salvage operation is probably 4 to 5 times greater than would be normal.

Dr. J. A. Milbrath of the Oregon Agricultural Experiment Station has consistently obtained either bacteria or Pythium sp. from specimens of the rotted tubers.

Poor ventilation and excessive moisture accentuated the rot. For example, one warehouse was a frame sheet metal building with a concrete floor. Bales of straw had been stacked along the inside wall to provide insulation. No false floor or horizontal vents were used at the base of the bulk pile which was about 12 ft. in depth. Occasional vertical vents were placed in the pile. Sweating had evidently occurred and the above mentioned organisms are causing rapid decomposition of the tubers. Vertical sections through the pile contained a greater number of rotted tubers, apparently coinciding with the drip of condensation from the metal roof.

The practicability of sheet metal roofing for storage houses in this region is questionable. Warehouses have been noted where it is necessary to arrange sacks of dry seed carefully to avoid the drip of condensation from such roofs. The low specific heat of the metal apparently allows the air to warm considerably during periods of sunshine and the sudden drop in temperature at night causes excessive moisture condensation that drips from the seams or overlap of the metal sheets. Since relatively high humidity prevails in this area, the amount of condensation may be considerable in some instances. Mr. F. E. Price of the Agricultural Engineering Department of the Experiment Station has suggested inexpensive methods to overcome this difficulty.

EMERGENCY PLANT DISEASE PREVENTION PROJECT. December 8.

## REPORTS ON OCCURRENCE OF FRUIT AND VEGETABLE DISEASES IN STORAGE

APPLE STORAGE DISEASES IN MAINE: Apple storages were visited mostly in southeastern Maine where the apple industry of the State is largely concentrated.

Storage scab (Venturia inaequalis) was found in storages in Winthrop, Monmouth, Livermore, Livermore Falls, Turner, and Portland. Many boxes of apples contained old scab lesions, but regardless of whether or not old lesions were present probably 75 to 85% of the boxes contained at least a few apples with storage scab. In many boxes practically every apple had storage scab. This disease was by far the most prevalent and serious disease of storage apples in southern Maine.

Except for the big cooperative storage in Portland where very little was found, blue mold (Penicillium expansum) was probably the next most prevalent disease of stored apples. It was quite common to find it in local and farm storages, but no great amount of damage could be attributed to it. Damage was confined to an individual fruit or two in an occasional box.

Sooty blotch (Gloeodes pomigena) was found at Winthrop, Monmouth and Portland. It was present in considerable amounts in Monmouth, and was quite serious in several lots of the cooperative storage in Portland. Local opinion was to the effect that sooty blotch is a more serious factor in Maine storages this year than usual.

Bitter pit (physiogenic) was found in Monmouth, Livermore and Portland. Although occasional lots showed quite a lot, losses from it probably are negligible.

Traces only of Rhizopus rot (Rhizopus nigricans) were found in one storage in Livermore. — Robert C. Cassell, Emergency Plant Disease Prevention Project. November 28 - December 4.

DISEASES ON STORED SQUASH IN MASSACHUSETTS: Two days were spent in Middlesex County inspecting squash storages. Twelve storages were visited in Waltham, Carlisle, Concord, Woburn, Dracut, Lowell, and Winchester. The amount of squash in each storage ranged from 25 to over 200 tons. In general squash in eastern Massachusetts is keeping remarkably well for this time of year. The season was dry at harvest time and the fruits went into storage dry and well cured. Most squash growers in the area are not marketing squash to any appreciable extent. As long as the fruits keep satisfactorily the tendency is to hold the product for higher prices.

Black-rot (Mycosphaerella citrullina) was by far the most predominant and destructive storage disease. The number of affected squashes ranged from a trace to 50% with an average of 13% for the 12 storages. Squashes affected with black-rot do not necessarily represent a total loss. Small or large lesions can be cut away and the remainder sold as cut squash for approximately half-price. Most black-rot infection areas occurred on the sides of the squash but in one storage about one-third of the infections occurred on the stem-end.

Bacterial wilt rot (Erwinia tracheiphila) was the second most destructive disease of stored squash. It was found in 8 of the 12 storages and ranged from a trace to 4% of the squashes infected with an average of about 1.5%. Fruits infected with the bacterial wilt organism are usually a total loss.

Very little Fusarium rot (Fusarium sp.) was found. It occurred in 4 of

the 12 storages. In 3 there was a trace only, but in the fourth about 5% of the squashes were infected.

Scab (Cladosporium cucumerinum) was found as a trace in one storage, on some of the small immature fruit. Robert C. Cassell, Emergency Plant Disease Prevention Project. December 5 - 11.

SWEETPOTATO STORAGE DISEASES IN INDIANA: One grower-operated and 3 custom-operated sweetpotato storage houses were visited in southern Indiana during the week ending December 4. Sweetpotatoes, of the Nancy Hall and Yellow Jersey varieties, being cleaned, graded, and packed, were examined for decay and losses. In all of these houses losses were about 1%, due principally to Rhizopus nigricans and Fusarium oxysporum. Approximately 3% of one lot of Yellow Jersey stored at Johnson in tight, poorly ventilated baskets were infected with R. nigricans. In another lot of Yellow Jersey stored at Poseyville about 3% were rotted by Fusarium oxysporum. Occasional roots rotted by Sclerotium bataticola and Diaporthe batatatis were found at each storage house. -- R. C. Baines, Emergency Plant Disease Prevention Project.

## REPORTS ON DISEASES OF VEGETABLE CROPS

General statements concerning some of the areas visited are given first, to avoid excessive repetition in reports on the various hosts. Except where noted otherwise, all of the reports are by members of the Emergency Plant Disease Prevention Project of the Bureau of Plant Industry, Soils, and Agricultural Engineering.

SOUTHERN FLORIDA: From November 23 to December 3 a survey was made on the muck soils in the vicinity of Belle Glade. This area generally has been dry this year, the deficiency in precipitation amounting to about 13.5 inches at the Everglades Experiment Station up to December 1. However, in November the rainfall of 2.8 inches, occurring largely on the 9th, 17th, and 19th, was about normal. -- R. A. Hyre.

FLORIDA WEST COAST AREA: During the period from December 1 to 10 the field survey was confined principally to beans, peppers, eggplants, and tomatoes, crops that might soon be affected by colder weather, with occasional examination of broccoli, cabbage, celery, or escarole when the condition of the plants or the maturity and impending harvesting of the crop seemed to require it. The areas visited include various sections in Manatee County and a portion of the Ruskin area in Hillsboro County to the north. -- F. P. Schlatter.

CALIFORNIA: During the week ending December 4 vegetable fields were examined in the Sacramento, Terminous, Stockton, and Santa Clara districts of central California.

During the following week a survey was made of the vegetable diseases in the coastal area, including the southern part of Monterey County and the northern part of Santa Barbara County. The principal crops here at this time of the year are crucifers (cabbage, cauliflower, broccoli, brussels

sprouts and radish), celery, lettuce, spinach, artichokes and some carrots. A few small fields of late tomatoes near the coast have so far escaped the frost. Throughout the entire area a large percentage of the land was bare at this time of the year. A large number of fields are now being planted to crucifers and lettuce. -- Horace L. Barnett, and E.W.Bodine.

ARTICHOKE DISEASES IN THE COASTAL AREA OF CALIFORNIA: A light infection of leaf spot (Ramularia cynarae) was found in all artichoke (globe) fields inspected near Arroyo Grande, Guadalupe, and Pismo Beach. A number of scattered plants showed extreme dwarfing (possibly of a virus nature) with faint mottlings in the leaves. -- Horace L. Barnett and E. W. Bodine. Week ending December 11,

BEAN DISEASES IN FLORIDA: Southern Florida - Over 700 acres of beans were observed in 26 different fields on the muck soils in the vicinity of Belle Glade. In addition the Markets were checked regularly. Largely because of dry weather foliage diseases were conspicuous by their absence this year. No rust was seen, and only a trace of powdery mildew (Erysiphe polygoni).

On about 325 acres Rhizoctonia solani stem lesions occurred in amounts varying from a trace to about 2%. On 14 acres a loss of from 10 to 15% of the pods was observed. On 15 acres Rhizoctonia and rootknot together were causing loss estimated at 25%.

One grower stated that he had plowed up 35 acres of beans because of rootknot (Heterodera marioni), and estimated his loss at $3000. He observed that rootknot was more severe this fall than usual because of the reduced soil moisture resulting from the relatively dry summer. Another grower lost 4 acres out of 75 because of rootknot. Varying amounts, usually light, were found in 55 acres.

Traces of watery soft rot (Sclerotinia sclerotiorum), were found at the Markets and in several fields during the week of November 22, following the rains of the preceding week. During the week the buying of beans for the fresh market fell off greatly because of the fear of "nesting" in transit due to this disease. In the field the disease was found in the second picking where the beans touched the soil.

Five percent of southern blight (Sclerotium rolfsii) was found in 10 acres and about 0.5% in another 5 acres.

In 30 acres from a trace to 2 or 3% mosaic (virus) infection was found.

Of 18 acres of Lima beans seen, 3 acres with a 65% stand had a trace of Rhizoctonia stem lesions. The remaining acreage appeared to be disease-free. -- R. A. Hyre

Florida West Coast - Beans are not grown extensively in the areas visited; where seen they were generally in good condition. No pod spotting was observed, and the leaves generally showed only weather injury or deterioration due to age and secondary organisms. -- F. P. Schlatter

AN OUTBREAK OF UROMYCES BETAE ON BEETS AND MANGELS IN WESTERN WASHINGTON: Beet rust (Uromyces betae) was widely distributed on varieties of garden beet and mangel in Western Washington in 1943. It was observed to be widespread in the areas around Mount Vernon, Montesano, and Port Angeles, occurring destructively in all areas. The disease was first observed in mid-

September in steckling beds for the 1944 seed crop, but epidemic development did not occur until late in October. Disease severity was apparently increased by the advent of fall rains and lower temperatures. The uredial stage is the destructive phase of the fungus. All beet and mangel varieties growing this season appeared to be susceptible. -- Glenn S. Pound, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture in Cooperation with Washington Experiment Stations.

DISEASES OF BEETS OBSERVED IN OREGON: Rust (Uromyces betae) was apparent on most plants observed in the "Dever area" north of Albany in Linn County (October 12). It was prevalent in the vicinity of Corvallis (November 12) but apparently had appeared too late to affect the root crop since roots of good size had developed and the only loss was in the tops. Rust was very prevalent on the foliage of Detroit Dark Red beets (Harris strain) being grown for seed on one farm near Eugene (November 16). The lesions were so abundant as to cause death of the leaves in many cases. However, as far as could be determined from casual inspection, the roots were little, if at all, affected, owing probably to the late development of the disease. It remains to be determined how rust will affect the seed crop here next year. There will undoubtedly be abundant inoculum next spring as the tops are being left on the portion of the crop that is being wintered over in the ground.

Ramularia leaf spot (Ramularia betae) was noted in several garden plantings near Corvallis (November 12); in some instances infection was severe but apparently it appeared too late to affect the root crop. A considerable amount of this leaf spot was observed on the farm near Eugene (November 16), where it was more abundant in earlier than in later plantings.

Small amounts of Cercospora beticola were observed at various locations.

A leaf spot caused by Epicoccum sp. was rather prevalent on the foliage of mature plants observed at the beginning of December on another farm at Eugene. These spots are wavy in outline, 3 cm. or more in diameter, sometimes confluent. Older lesions appear black by reflected light, translucent by transmitted light; young lesions appear black by both reflected and transmitted light. The young lesions contain hyphae of large diameter with numerous oil globules. -- Lytton W. Boyle

DISEASES ON BEETS AND CHARD IN CALIFORNIA: In Sacramento and Yolo Counties a number of beet root beds were inspected. In one a slight amount of downy mildew (Peronospora schachtii) was found causing slight damage to the heart leaves. Bordeaux 4-4-50 appeared to be controlling the spread of the disease. A slight amount, of curly top (virus) was found in one of the fields inspected. -- E. W. Bodine

Approximately 30% curly top infection was found in one small garden beet field in the coast region west of Buellton, Santa Barbara County. Only traces of rust and downy mildew (Peronospora schachtii) were found here.

Near Lompoc, Santa Barbara County, a slight to moderate amount of curly top was found in a small field of Swiss chard; a slight amount of downy mildew was present in the seed plantings; and a moderate amount of rust occurred on older plants and a slight amount on young plants grown for seed. -- Horace L. Barnett and E. W. Bodine.

ASTER YELLOWS ON CARROTS IN PACIFIC COAST AREAS: About 2% of the plants in a planting near Coquille, Oregon, showed clearcut typical symptoms of aster yellows (virus), scattered evenly throughout the planting. In a planting south of Cottage Grove the tops showed proliferation and bolting suggestive of a virus infection such as yellows but not conforming in all respects to the symptoms noted for this disease on the common red carrot. This was a white variety that grew with the root extending above the soil line in an unusual way. Only a trace of the disease was found and it is probable that the somewhat atypical expression of symptoms may be simply a varietal reaction. -- Lytton W. Boyle, December 1 - 4.

Only a few plants were found infected with the aster yellows virus in the carrot root beds inspected in Sacramento and Yolo Counties, California. -- E. W. Bodine

CELERY DISEASES IN FLORIDA: Southern Florida - Numerous seedbeds and over 400 acres of celery in the field were observed in the vicinity of Belle Glade. Cercospora apii was generally present in both seedbeds and field; it was often severe on the lower, older leaves. Small amounts were found occasionally on the top leaves, but regular spraying has held it well checked. -- R. A. Hyre

Florida West Coast - One rather large planting at Tallevast, of 2 months' growth, was found to be rather severely affected by early blight (Cercospora apii), mainly on the lower but also to some extent on the side leaves. No spraying had been done as yet. Unless soon checked this situation may become serious. -- F. P. Schlatter

CELERY DISEASES IN CALIFORNIA: In central California aster yellows (virus) caused moderate loss in one field in the vicinity of Sacramento; in the Terminous district it was found to be widespread, but only causing slight damage; it was more prevalent in the Santa Clara area than in the Terminous district, but causing slight to moderate damage. Western celery mosaic was rather prevalent and causing moderate loss in the Sacramento and Terminous districts; in the Santa Clara district it was causing only slight damage. Calico was found only on a few plants of the Golden type in the Terminous district. Spotted wilt was generally present and causing slight damage in the Santa Clara district.

Late blight (Septoria apii) was found causing moderate loss in one field in the vicinity of Sacramento. In the Santa Clara and Stockton areas a slight amount of infection was recorded in all fields inspected. No late blight, however, was found throughout the entire Terminous district.

Pink rot (Sclerotinia sclerotiorum) was found causing slight loss in some fields in the Terminous area, where the celery was banked up with soil for bleaching. A few plants were found infected in some fields in the Santa Clara district. Practically all the Golden type celery has been harvested in the Terminous district.

In the coastal region of Santa Barbara County, only a slight amount of aster yellows was found in all the fields examined. An undetermined disease (possibly of virus nature) was found in a few fields in the Santa Maria district. A relatively small number of plants affected with this trouble was noticed. In general only a slight amount of late blight was

found in the Lompoc, Santa Maria, Arroyo Grande, and Guadalupe areas. In one field of approximately 50 acres near Lompoc, the infection was slight to moderate with many plants severely infected. All growers were using some form of copper, either as sprays or dusts, in combating the disease and were obtaining excellent results. Cottony rot (Sclerotinia sclerotiorum) was found in several fields on only a few scattered plants. -- Horace L. Barnett and E. W. Bodine.

DISEASES OF CRUCIFEROUS CROPS ~~IN FLORIDA~~: Cabbage Diseases in the Belle Glade Region - About 155 acres were observed in the field, from young seedlings and transplants to mature cabbage.

Black rot, Xanthomonas campestris, was scattered on 100 acres of immature cabbage. On 4 acres of nearly mature plants the estimated loss was 2% with an equal amount likely to develop from leaf lesions already present.

A girdled stem condition occurred in spots in 1 field, severe enough for the grower to point it out. It was thought to be due to Rhizoctonia. Specimens were sent to Dr. W. W. Ray. Downy mildew, Peronospora parasitica, was widespread this year in seedbeds and on seedlings in the field. Two growers estimated their seedbed loss at about $500 each. One of the seedbeds was not treated; the other was dusted with copper-lime dust. The grower of the dusted seedbed claims that he set mildew-free plants in the field and dusted them weekly with copper-lime dust, but that rather severe mildew developed in spite of these control measures. The disease was generally present in fields on lower leaves but was apparently causing little damage except in 4 or 5 acres of plants just starting to head, where considerable defoliation was occurring. -- R. A. Hyre

Diseases of Broccoli and Cabbage on the West Coast - Only one large planting (80 acres) of broccoli was observed at Ruskin. A rather high percentage of the leaves showed plentiful spotting from downy mildew, extending from the lowest well up on the side leaves, but it is questionable whether the vitality of the plants was affected appreciably. More serious, and causing considerable loss, was a condition affecting the flower head in which the center portion turns brown and remains somewhat sunken, often accompanied by a moist surface rot over the browned area. Plants so affected frequently are found to have hollow stems, which indicates that the original cause of the condition is a mineral deficiency (perhaps boron) with the surface decay due to secondary organisms.

In casual observation of many cabbage fields in passing, spots due to downy mildew or caused by Alternaria or other fungi were commonly noted, but none were considered to be of great importance at present. In 2 fields rather frequent black rot [Xanthomonas campestris] infections were found, of minor importance as yet and existing mainly as small affected leaf areas in one field, but becoming serious in the other field where many plants were showing bad discoloration and becoming lopsided; loss of heads in the latter field may well reach 25% or more. -- F. P. Schlatter

DISEASES OF CABBAGE AND BROCCOLI IN LOUISIANA: Numerous cabbage fields were examined during a trip through a portion of the winter vegetable area, November 30 to December 4, made in company with Dr. Paul R. Miller and Dr. E. C. Tims. In most fields a trace of downy mildew was found but in no field was it serious. Alternaria leaf spot [species not designated] was

found in scattered fields but infection was very light. In 1 planting of 250 acres black rot was found to vary in different cuts. In 1 cut, of 3 acres, primary infection on plants was estimated at 0.5% with a secondary spread to 75% of the plants. Serious losses undoubtedly will occur in this field if the weather continues warm. Other fields in this large acreage showed varying amounts of secondary spread ranging from a trace to 20% while some cuts showed no black rot. A trace of black rot was found in cabbage on 3 additional farms; however, several farms were observed that showed no evidence of black rot. One field of broccoli was observed on this farm that showed a trace of black rot and downy mildew. -- L. H. Person.

DISEASES OF CRUCIFEROUS CROPS IN OREGON: Ring spot (Mycosphaerella brassicicola) was prevalent on mature plantings of cauliflower and cabbage near Marshfield, and occurred throughout cabbage fields examined at Langlois where it had not been observed prior to this year.

At Coquille, in a year-old cabbage planting being held for the seed crop, practically every head showed some evidence of Botrytis infection. In some instances the rot had included the leaves of bolting buds on which the seed crop would be produced later. Under the humid temperate conditions of this region it appears that sanitary practices to remove masses of old infected tissue from the fields may be necessary to avoid loss in the seed crop.

Cabbage at Coquille shows far more Macrosporium leaf spot (Macrosporium herculeum) [= gray leaf spot, Alternaria herculea, but see footnote, P.D.R. 27: p. 317, no. 16] than last season. In the early stages, the spots appear extremely black; mature spots are large, ragged, semi-zonate.

Leaf spots caused by Cercosporella albo-maculans are prevalent on the lower leaves of turnips at Coquille. -- Lytton W. Boyle, December 1 - 4.

DISEASES OF CRUCIFEROUS CROPS IN CALIFORNIA: Central California in the Sacramento-Stockton-Santa Clara Districts - Virus diseases were causing slight damage in plantings examined in these districts. Black ring occurred on a small number of broccoli plants in several fields in the Santa Clara area, and a few infected cabbage plants were found in the vicinity of Sacramento. Mosaic in slight to moderate amounts was recorded in some cabbage fields in the Santa Clara district; it was widely scattered in all cauliflower fields inspected in the Sacramento and Santa Clara districts; and a number of mosaic-infected turnip plants were found in one small field near Sacramento.

Coastal Area — Southern Monterey County to Northern Santa Barbara County - Downy mildew was general on cabbage throughout the area surveyed but was causing only slight damage. Powdery mildew (Erysiphe polygoni) was observed on a small number of plants in the Lompoc and Santa Maria areas of Santa Barbara County. A number of decayed heads affected by gray mold rot (Botrytis sp.) were seen in a small seed planting near Lompoc. Cottony rot (Sclerotinia sclerotiorum) was found on a few plants in a seed planting near Lompoc.

On cauliflower, downy mildew was generally present but apparently was causing no damage. Mosaic was general throughout the area, scattered diseased plants being found in all fields.

Only traces of downy mildew and mosaic were found on broccoli. A few brussels sprouts plants affected by gray mold rot were found in one field planted for seed.

Downy mildew was prevalent in all plant beds of crucifers examined; however, the further spread of the disease to new leaves was apparently arrested after the plants were set out in the field. The aphid population in the fields was high, especially on the younger plants. -- Horace L. Barnett and E. W. Bodine.

Los Angeles County - November 30 was spent with Dr. J. T. Middleton, visiting a number of cauliflower and broccoli plantings in Los Angeles County. Two plantings of cauliflower and one of broccoli were found to have approximately 3% of the plants affected by mosaic. No doubt a larger percentage were infected without showing symptoms. An occasional cauliflower plant was seen with symptoms of downy mildew. One grower was having considerable trouble with what he termed "blind head" in cauliflower. The apical bud fails to develop further after a half-dozen leaves are formed. -- Seth Barton Locke.

EGGPLANT DISEASES IN FLORIDA: Numerous fields were observed in all west coast sections visited. In very few was there any near approach to a full stand of plants; whereas the loss in diseased or dead plants in many fields ranged from 10 to 50%. A few fields are considered scarcely worth keeping, and some have been interplanted with squash. Symptoms most frequently encountered either as stem cankers or as fruit rot indicate Phomopsis vexans as the cause, while in a few fields the trouble was clearly due to Sclerotium rolfsii.

No appreciable loss due to damping-off was observed in seedbeds being held for spring planting, and relatively little loss in the fall seedbeds from this cause has thus far been reported by any growers interviewed. -- F. P. Schlatter.

DISEASES OF ESCAROLE IN THE FLORIDA WEST COAST AREA: Escarole was examined principally where harvesting was in progress. In general, little loss due to disease has thus far been indicated. A very small percentage of heads has been lost due to mosaic (virus), tipburn (physiogenic), bottom rot (Rhizoctonia solani), or Sclerotinia drop (S. sclerotiorum). In the worst field observed thus far the loss has been possibly 5 to 10%, due chiefly to bottom rot and tipburn. In most cases the bottom rot has affected the lower leaves only; the stalk is not yet attacked and the head may be cut in good condition. Occasionally bottom rot is found to have attacked plants previously affected by either mosaic or tipburn. -- F. P. Schlatter

LETTUCE DISEASES IN CHIC, and Indiana GREENHOUSES: During the week ending December 4 greenhouses in Cuyahoga County near Cleveland were inspected. Five lettuce houses covering 15-3/4 acres were examined. In this area, unlike both Cincinnati and Toledo, lettuce is largely immature and harvesting will start with the "Christmas trade". The variety used is Tipburn Resistant, a selection of Grand Rapids. Light conditions in the Cleveland area seem to make impractical the use of the U. S. 101 strain so commonly used in other areas earlier in the season.

No tipburn was seen in any of the houses inspected. Lettuce in one house showed a slight amount of decay from Botrytis sp. In another house dahlias imported from California, infected with the spotted wilt virus disease, had previously been grown, and some spotted wilt had been transmitted to lettuce in past seasons, but the present crop is free largely because frequent fumigations have kept out thrips. -- M. R. Harris

DISEASES OF GREENHOUSE LETTUCE IN INDIANA: Lettuce examined in 4 different greenhouse establishments near Evansville during the week ending December 4 was relatively free from disease. In 2 houses a few plants infected with Sclerotinia sclerotiorum (drop) and Botrytis cinerea (gray mold) were found. In one house occasional plants were infected with a virus disease resembling brown blight and what appeared to be aster yellows. -- R. C. Baines

and ~~LETTUCE DISEASES~~ IN OREGON: About 6% of a planting observed in the lower part of Multnomah County (October 18) showed symptoms of yellows. In some of the plants a Botrytis species was evident on the necrotic heart. In the Lake Libish area north of Salem in Marion County (November 11), losses of from 25 to 50% were noted, due to poorly formed heads of which the primary cause is questionable. Root rot (Sclerotinia sp.) was prevalent; also yellows (virus), and Botrytis sp. -- Lytton W. Boyle.

and ~~LETTUCE DISEASES IN~~ CALIFORNIA: In general the lettuce diseases were causing very little loss in the coastal area: southern Monterey to northern Santa Barbara County. Drop (Sclerotinia sclerotiorum) was general in most fields but was usually represented only by scattered plants. Gray mold rot (Botrytis cinerea) was general but causing only slight damage. Downy mildew (Bremia lactucae) was general but the infection was light in most fields. Aster yellows (virus) was found only on a few diseased plants in the Lompoc and Arroyo Grande districts and none was seen in the fields examined near Santa Maria. -- Horace L. Barnett and E. W. Bodine. Week ending December 11.

? SQUASH DISEASES IN FLORIDA: Downy mildew (Pseudoperonospora cubensis) has been very prevalent in most of the many fields observed in the west coast area, occurring abundantly not only on the lower leaves but on the higher leaves as well. In some cases powdery mildew (Erysiphe cichoracearum) has also been found to be prevalent as a later arrival. The extent of damage to the crop from these mildews may be quite negligible in some cases, but where severe spotting of the leaves is followed later by browning and death of whole leaf surfaces the aggregate effect on the life of the plant must certainly be considerable. However, many growers believe that the effect on the crop is unimportant, according to them, the foliage is merely "going back".

Fruit Rots. In one field in Hillsboro County a brown rot was very prevalent on young fruits of all sizes. Sometimes it occurred on the young fruits even before the blossoms had opened; often the fruits had attained some size before being rotted. Generally, secondary organisms (Alternaria and possibly Fusarium) were found following the primary decay in from the

blossom end, often causing a soft final rot. Whether this trouble is actually due to a fungus or only to breakdown of the young fruit due to lack of pollination has not been determined. In the field it is important, having already destroyed at least 20 to 25% of the young fruits and probably taking further toll of newly-forming fruits.

In 2 large fields in the Cortez area, a high percentage of the young fruits were either attacked or completely destroyed by Choanephora [cucurbitarum]. Many fruits had already reached picking size before being attacked. Very commonly the youngest fruits were destroyed before making any growth, becoming completely enveloped by the typical black fungus mass. The loss in one of these fields can easily range from 25 to 75% of the crop, if the attack continues. No killing of plants due to this fungus has been observed as yet. F. P. Schlatter

DISEASES OF SHALLOTS IN LOUISIANA: From November 30 to December 4 a trip was made through a portion of the winter vegetable area of Louisiana, in company with Dr. Paul R. Miller and Dr. E. C. Tims. A number of fields of shallots were observed. Pink root (Phoma terrestris) was found in several. Only a relatively few plants showed visible stunting from this disease; however, in one field visited where the shallots were apparently growing normally, 75% of the roots when pulled were discolored by pink root.

A very severe stunting and yellowing of shallots was observed in several fields. On one farm where approximately 100 acres of shallots were observed, 2 cuts of 4 to 5 acres each showed between 3 and 5% of the plants affected with this trouble, and several other cuts from 1 to 2%. This condition has been noted previously in shallots in Louisiana. It appears to be of virus nature, but little work has been done on it, and symptoms have not been transmitted to healthy shallots. Dr. Tims of the Louisiana Experiment Station is planning to study this trouble.

White rot (Sclerotium cepivorum), which was reported from Louisiana for the first time last year, was not observed on this trip in fields where it had been very severe last year. Evidently it is too early for the disease to be appearing as yet. -- L. H. Person

SPINACH DOWNY MILDEW IN CALIFORNIA: Downy mildew (Peronospora effusa) was found in most fields throughout the coastal area surveyed. Two heavily infected fields totaling about 30 acres were found in the southern part of the Salinas Valley. From present indications the loss in these fields will be heavy. Spinach near Arroyo Grande was noticeably free from this disease. A slight amount of infection was found in fields near Santa Maria. -- Horace L. Barnett and E. W. Bodine

PEPPER DISEASES IN THE FLORIDA WEST COAST AREA: Many pepper fields of considerable acreage were observed, most of them being in good condition. The growth of many plants, sometimes throughout whole fields, appears to be stunted and the plants lack size owing to the effects of excessive rains following planting; but the color and vigor of the foliage at present appears to be good. Mosaic (virus) has been noticed rather rarely, and affecting only a few plants in any field. Leaf spots and fruit rots have been found only occasionally, and it appears from observations thus far that diseases have caused little or only very minor losses. Insects and growth factors seem to have been of greater importance. -- F. P. Schlatter

PEPPER DISEASES IN CALIFORNIA: In the coastal area Alternaria fruit rot (Alternaria sp.) was found causing slight damage. Approximately 2% of the plants in a 50-acre field planted for commercial purposes were killed or severely damaged by collar rot (Sclerotinia sclerotiorum). In a 40-acre field of seed peppers a few plants were found showing symptoms of verticillium wilt (Verticillium alboatrum). -- Horace L. Barnett, and E. W. Bodine

LEAF SPOT OF SWEETPOTATO IN FLORIDA: Few sweetpotatoes are grown in the southern Florida area. About 12 acres have been seen to date; 10 acres of these were east of Homestead on the East Coast.

The fungus causing a leaf spot collected near Belle Glade was determined by Dr. Charles Chupp as Cercospora ipomoeae. A similar spot was abundant on the 10 acres seen near Homestead. -- R. A. Hyre.

GREENHOUSE DISEASES OF TOMATOES IN OHIO: During the week from November 29 to December 4 greenhouses in Cuyahoga County near Cleveland were inspected. Four tomato houses covering 10-3/4 acres were examined. With one exception of one house the tomato plantings inspected were in full production and in most of them the vines will be taken out in a few more weeks to make way for the spring crop. On the average, fruit sets were heavy.

Fusarium wilt (Fusarium bulbigenum var. lycopersici) was beginning to be extensive in one house and was present in another. Soil sterilization is the factor controlling this wilt and where soil is not completely sterilized the plants will eventually show some wilt.

In all of the houses there was a trace of leaf mold (Cladosporium fulvum). In none was the disease sufficiently severe to warrant the use of control measures since the vines were nearing the end of their productive capacity.

Cucumber mosaic (virus) in one house was increasing in amount and may reduce total production before the season ends.

In the Cleveland area greenhouse tomato growing is an important industry with a gross yearly income of well over a million dollars. In the past diseases have reduced the income considerably but present indications are that this year's crop will escape serious loss. -- M. R. Harris

TOMATO DISEASES IN INDIANA GREENHOUSES: Approximately 80% of the tomatoes in a greenhouse establishment at Terre Haute examined during the week ending December 4 were infected with what appeared to be largely single-virus streak. The first-set fruit was ripening and it appeared that this disease will reduce the yield at least 10 to 15%. In these same greenhouses about 0.5% of the plants were infected severely with Fusarium oxysporum f. lycopersici [F. bulbigenum var. lycopersici]. -- R. C. Baines

TOMATO DISEASES IN FLORIDA: Southern Florida - The only tomatoes seen were at the Everglades Experiment Station at Belle Glade. A trace of Cladosporium leaf mold, small amounts of early blight (Alternaria solani), and some rootknot (Heterodera marioni) and mosaic (virus), were present. -- R. A. Hyre.

Florida West Coast - Many fields were observed, in various stages of growth, from those where picking had not yet commenced to others where it

was practically completed.

Early blight has been found commonly in most of the older plantings, degree of infection varying with age of plants, efficiency of spraying for control, and whether the plants were staked or sprawling. It was observed to be worst on older plants, particularly on those not staked, in some cases affecting as high as 50% of the leaf area. On the average it has been perhaps of only minor importance, but in several instances the effect on the vitality of the plants and on the resultant crop must be quite appreciable.

Fusarium wilt has been found rather commonly in all sections visited, the extent varying with variety and age of plants. The worst-infected plantings were generally claimed to be Marglobe, Grothen Globe, or Rutgers; but Rutgers and Pan America were generally observed to be quite free from wilt, perhaps due to their more vigorous growth or to the fact that they were usually less mature. In many older fields the estimates of wilt occurrence ranged from 20 to 30%; while in younger fields often very little or no wilt was observed. Observations indicate that as plants approach maturity and bearing the wilt may, and very frequently does, become an important factor in crop loss.

Bacterial wilt (Pseudomonas solanacearum) was definitely recognized in only one field where it occurred to only a slight extent (1 to 2%).

Instances of mosaic (virus) and some of the less easily distinguishable physiological troubles were observed occasionally but have been relatively unimportant.

One field of mature plants, much stunted in growth and lacking in color, was found to be plentifully infested with the rootknot nematode.

Fruit rots have been observed in relatively few fields as yet. Occasionally an instance of bacterial soft rot (Erwinia aroideae) has been noted; and in 3 fields where the plants were not staked there was an appreciable loss of fruits due to Rhizoctonia solani and other soil organisms, estimated as high as 20% or more. In areas where staking is not practiced, and where surface irrigation is continued into the harvest period, losses from these rots due to soil organisms must be very considerable. -- F. P. Schlatter.

TOMATO DISEASES IN CALIFORNIA: A few small fields of late tomatoes near the coast have so far escaped the frost. In general curly top (virus) caused only slight damage near Pismo Beach and Arroyo Grande. Psyllid yellows (induced by Paratrioza cockerelli) was found to be slight to moderate in small fields of tomatoes near Pismo Beach and Lompoc. Spotted wilt (virus), possibly in connection with mosaic, was causing considerable damage in a 2 acre plot of staked tomatoes at Arroyo Grande. Approximately 90% of the plants were infected. -- H. L. Barnett and E. W. Bodine

## REPORTS ON DISEASES OF POTATO

POTATO DISEASES IN SOUTHERN FLORIDA: Over 1200 acres were observed in the vicinity of Belle Glade. Some trouble was encountered in obtaining a good stand from some of the northern seed because of the problem of dormancy.

Early blight (Alternaria solani) was generally present in small amounts on about 1000 acres. On 200 acres it was severe and was defoliating the plants, sometimes before the crop was "made".

Traces of late blight (Phytophthora infestans) were seen in 3 different fields.

On about 550 acres the loss from stem rot (Rhizoctonia solani) was estimated at from 6 to 10%. This seed failed to meet the certification standards. Traces of stem rot were seen on another 200 acres.

A trace to about 2% mosaic (virus) was seen in about 700 acres. In about 50 acres where 1-year old seed was used, 12% mosaic was present. -- R. A. Hyre, Emergency Plant Disease Prevention Project.

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1943 LOSS FROM POTATO LATE BLIGHT IN IOWA: According to the Iowa Crop Report release as of October 1, 1943, the Iowa potato harvest amounted to 5,415,000 bushels. On the basis of the Plant Disease Survey report the total loss to this crop caused by the late blight organism (Phytophthora infestans) was placed at 16% for 1943. Fifteen percent of this loss resulted from injury to the vines and only 1% was from tuber infection. Late blight caused a reduction of 1,031,428 bushels. We estimate that the extension plant disease program supplemented by our forecasting service increased the grower's crop by 10%. -- C. M. Nagel, Emergency Plant Disease Prevention Project.

## SOME REPORTS ON DISEASES OF FRUIT AND NUT CROPS

DISEASES OF ALMONDS AND APRICOTS IN CALIFORNIA: In the vicinity of Greenfield and King City, Monterey County, a slight to moderate amount of rust (Tranzschelia pruni-spinosae) was present on green leaves on the lower portions of almond trees. Such infection on the green leaves is claimed to be the main source of carryover for the succeeding year.

A trace of leaf spot (Cladosporium sp.) was observed on almonds.

No rust was found on the green leaves of apricot in the Greenfield-King City area. Slight to moderate infection was found west of Buellton, Santa Barbara County. -- H. L. Barnett and E. W. Bodine, Emergency Plant Disease Prevention Project. Week ending December 11.

CITRUS DISEASES IN LOUISIANA: The citrus-growing area of Louisiana, located in the extreme southern portion of Plaquemines Parish, was visited with Dr. A. G. Plakidas, pathologist of the Louisiana Agricultural Experiment Station, during the week of November 22 to 27. The citrus area is small and localized, and within the past 3 or 4 years spraying and dusting have become generally practiced by most growers with the result that diseases are now fairly well controlled.

Scab (Elsinoë fawcetti) was found on Satsuma orange, grapefruit, and sour orange, only a trace being found in any one orchard. Melanose (Diaporthe citri) was found on sweet orange but was causing no losses in sprayed orchards. The most apparent damage to the fruit was caused by the rust mite in orchards that were not dusted late enough into the season to control the pest. -- L. H. Person, Emergency Plant Disease Prevention Project.

## BRIEF NOTES ON PLANT DISEASES

VERTICILLIUM WILT OF SOME TOMATO RELATIVES IN CALIFORNIA: The tomato relatives, Lycopersicum pimpinellifolium, L. peruvianum, and L. hirsutum, have become of special interest to tomato breeders because of inherent resistance to certain tomato diseases. That these species, however, are susceptible to Verticillium wilt was demonstrated in a tomato plot planted the past season at Davis, California. Several plants of these three species, as well as of L. esculentum (Norton variety) were found showing typical vascular and foliage symptoms of Verticillium wilt. Wilted plants of all of the above species except L. hirsutum were cultured. In every such case V. albo-atrum was isolated from the internally discolored stem tissues. -- Paul G. Smith and William C. Snyder, Divisions of Truck Crops and Plant Pathology, University of California, Davis and Berkeley, California.

CORN EAR ROTS AND RUSTS ON SMALL GRAINS IN IOWA: During the week ending December 11, observations for field corn ear rots and for diseases on late volunteer cereals and grasses were made in northwest Iowa, in Lyon, Osceola, Dickinson, and Emmett Counties.

Data were taken on recently husked ear corn in cribs. Stalk examinations were not made in the field, such as were made earlier, because nearly all of the corn at this date has been husked and placed in crib storage. In the area examined the following ear rots were observed, the range and average percentage being given: Diplodia zeae ranged from 2 to 9%, average 5.3%; Fusarium moniliforme from 1.5 to 3%, average 2%; Gibberella zeae from 3.5 to 6%, average 4.5%; Nigrospora oryzae from 1 to 3.5%, average 2.2%.

In the same area the rusts were prevalent on volunteer cereals as follows: on oats, Puccinia graminis and P. coronata; on rye, P. graminis; on barley, P. graminis. -- C. M. Nagel, Emergency Plant Disease Prevention Project.

VEGETABLE SEED-TREATMENT TESTS IN WESTERN WASHINGTON -- A CORRECTION: Dr. C. J. Gould writes to correct some errors in Table 1 of his article in the November 1 issue (number 22). Changes should be made as follows:

Page 595 - Tomatoes: Fermate - Change 0.25% dosage to 0.5%
Page 596 - Onion: Fermate, 0.5% dosage - Change #1 results from 65.0 to 55.0
Page 598 - Swiss Chard: 2% Ceresan, 1% dosage - Change #1 results from 96.0 to 98.0 and grand average from 69.2 to 70.2
Page 599 - Cucumbers: "F" value for Farm #2 - Change from 728.8 to 7.29.

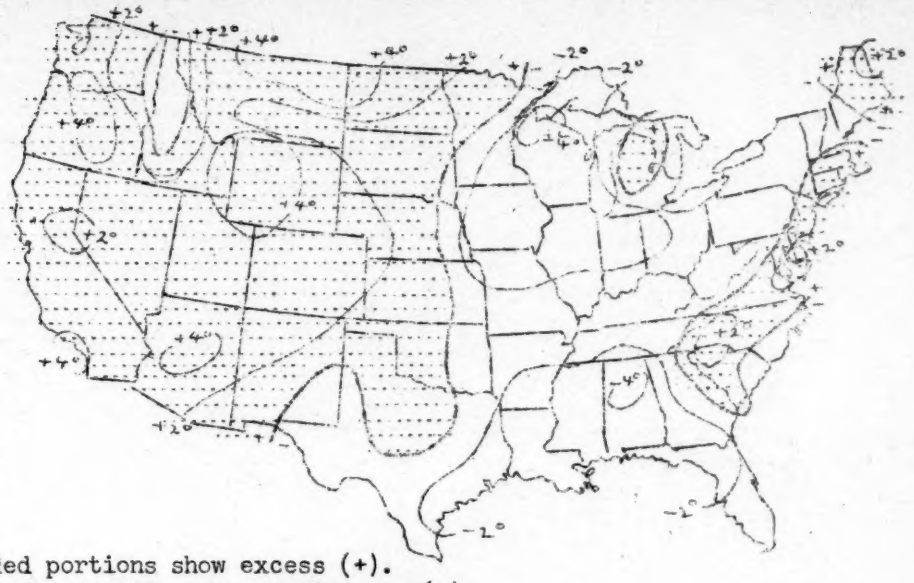
The correct figures are underlined.

## NOVEMBER WEATHER

(From the U. S. Department of Commerce Weather Bureau, Weekly Weather and Crop Bulletin for the week ending December 7, 1943.)

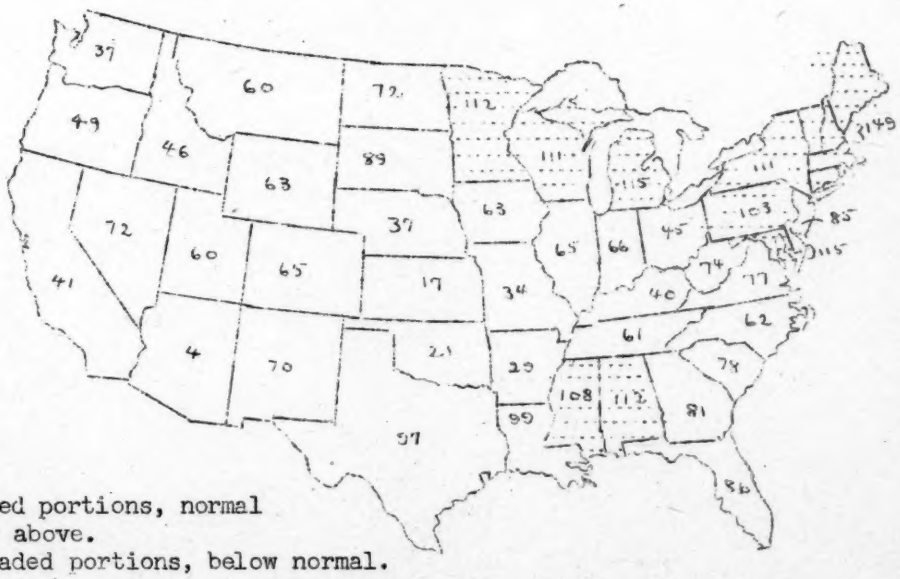
Map 1 shows that November mean temperatures were somewhat above normal in most of the Atlantic area and rather generally over the western half of the country, while the area from the Appalachian region westward to the eastern Plains had somewhat below normal temperature. However the anomalies of both signs were comparatively small, ranging mostly from 1° to 3°.

Map 2 shows the percentage of normal precipitation by States. The greatest deficiencies in November are shown for the far Southwest, the central and southern Plains and the lower Missouri Valley. Arkansas had the driest November since 1910, and Arizona and Oklahoma since 1932.



Shaded portions show excess (+).
Unshaded portions show deficiency (-).
Lines show amount of excess or deficiency.

Map. I - Departure of Mean Temperature from the Normal, November 1943



Shaded portions, normal or above.
Unshaded portions, below normal.

Map. II - Percentage of Normal Precipitation by States, November 1943